

ABSTRACT

Noise is reduced in a video system by applying motion compensated temporal filtering using previously generated motion vectors and adaptive spatial filtering at scene change frames. Various types of noise can be introduced into video prior to compression and transmission. Artifacts arise from recording and signal manipulation, terrestrial or orbital communications, or during decoding. Noise introduced prior to image compression interferes with performance and subsequently impairs system performance. While filtering generally reduces noise in a video image, it can also reduce edge definition leading to loss of focus. Filtering can also tax system throughput, since increased computational complexity often results from filtering schemes. Furthermore, the movement of objects within frames, as defined by groups of pixels, complicates the noise reduction process by adding additional complexity. In addition to improvements made to FIR spatial filtering, the present invention improves on previous filtering techniques by using Infinite Impulse Response (IIR) temporal filtering to reduce noise while maintaining edge definition. It also uses motion vectors previously calculated as part of the first-pass image encoding or alternatively by transcoding to reduce computational complexity for P-frame and B-frame image preprocessing. Single stage P-frame temporal noise filtering and double stage B-frame temporal noise filtering are presented.